The Baby and Infant Screen for Children with aUtIsm Traits-Part 3: The development of age-based scoring procedures

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ABSTRACT

The objective of the current study was to develop age-based scoring procedures for the BISCUIT-Part 3, an assessment measure of challenging behaviors in infants and toddlers aged 17–37 months. Separate age-based cutoffs were developed for those with an autism spectrum disorder (ASD) and those with non-ASD related developmental delays, using the standard deviation from the mean method. The sample consisted of 3022 infants and toddlers and their parents. As age increased in those with ASD, higher cutoff scores were required. Less variation was seen in the cutoff scores established for those with non-ASD related delays. The findings suggest that as children with ASD grow older, challenging behaviors become more frequent and severe. Additionally, they become easier to detect in comparison to same-aged peers. The implications of these results are discussed.

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1. Introduction

Autism spectrum disorder (ASD) is a neurodevelopmental disorders defined by impairments in social communication and social interaction, as well as the presence of repetitive and/or restricted behaviors and/or interests (Bodfish, Symons, Parker, & Lewis, 2000; Cederlund, Hagberg, & Gillberg, 2010; Charman et al., 2003; Duffy & Healey, 2011; Fodstad, Matson, Hess, & Neal, 2009; Hauck, Fein, Waterhouse, & Feinstein, 1995; Horovitz & Matson, 2010; Landa, Holman, & Garrett-Mayer, 2007; Lord & Paul, 1997; Macintosh & Dissanayake, 2006; Matson, Dempsey, & Fodstad, 2009; Matson, Dempsey, & LoVullo, 2009; Matson, Mayville, Lott, Bielecki, & Logan, 2003; Militerni, Bravaccio, Falco, Fico, & Palermo, 2002; Mundy, 2003; Rutter, 1968, 1978; Wetherby, Watt, Morgan, & Shumway, 2007). Increasingly, focus is being laid on the implementation of early intervention, as researchers have suggested that early intervention may lead to improved outcomes (Corsello, 2005; Eikeseth, Smith, Jahr, & Eldevik, 2007; Eldevik, Eikeseth, Jahr, & Smith, 2006; Fenske, Zalenski, Krantz, & McClannahan, 1985; Harris, Handleman, Gordon, Kristoff, & Fuentes, 1991; Howard, Sparkman, Cohen, Green, & Stanislaw, 2005; Matson, 2007; Matson & Smith, 2008; Matson, Wilkins, & González, 2008; Peters-Scheffer, Didden, Korzilius, & Sturmey, 2011; Remington et al., 2007; Shea, 2005; Smith, 1999). Of equal importance is the early identification of those in need of such early intervention services. While much of the research to date in early assessment has focused on diagnostic features, associated features of ASD, such as challenging behaviors, have often been ignored.

Challenging behaviors, also commonly referred to as maladaptive or problem behaviors, occur frequently in individuals with ASD (Cohen, Yoo, Goodwin, & Moskowitz, 2011; Matson & Nebet-Schwalm, 2007). In fact, it is estimated that over half of individuals with ASD engage in at least one challenging behavior (Baghdadli, Pascal, Grisi, & Aussilloux, 2003;

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Bodfish et al., 2000; Holden & Gitlesen, 2006; Matson & Nebet-Schwalm, 2007; Matson, Wilkins, & Macken, 2009). The term challenging behaviors is applied to a number of behaviors with different topographies, including aggression, property destruction, tantrums, and self-injurious behavior (SIB) (Cohen et al., 2011; Hattier, Matson, Belva, & Horovitz, 2011; Horovitz, Matson, Rieske, Kozlowski, & Sipes, 2011; Matson & Rivet, 2008; McCarthy et al., 2010; Weeden, Mahoney, & Poling, 2010). Although challenging behaviors are not specific to ASD (Dominick, Davis, Lainhart, Tager-Flusberg, & Folstein, 2007; Emerson et al., 2001; Holden & Gitlesen, 2006; Lavigne et al., 2009; McCarthy et al., 2010), researchers have shown that individuals with ASD are more likely to engage in challenging behaviors than are individuals from other populations, with individuals with ASD and comorbid intellectual disability (ID) engaging in the highest rates (Bodfish et al., 2000; Matson & Rivet, 2008; McCarthy et al., 2010; Rojahn, Wilkins, Matson, & Boisjoli, 2010). Challenging behaviors are typically chronic, occurring throughout the lifespan (Ballaban-Gil, Rapin, Tuchman, & Shinnar, 1996; Billstedt, Gillberg, & Gillberg, 2007; Matson, Cooper, Malone, & Moskow, 2008). These behaviors can severely impact an individual's overall development and quality of life. Challenging behaviors can increase the risk of injury to self and others, interfere with skill acquisition, limit an individual's opportunities to socialize appropriately, limit an individual's involvement in community activities, increase stigmatization, lead to monetary repercussions, lead to psychotropic medication use, and, in severe cases, lead to death (Horner, Carr, Strain, Todd, & Reed, 2002; Luiselli, Blew, Keane, Thibadeau, & Holzman, 2000; Luiselli & Slocumb, 1983; Matson & Nebel-Schwalm, 2007; McLoughlin, 1998; Mukaddes & Topcu, 2006; Paclawskyj, Matson, Rush, Smalls, & Vollmer, 2000, 2001; Peters-Scheffer, Didden, Mulders, & Korzilius, 2010; Sigafoos, Arthur, & O'Reilly, 2003).

Given the potential severe effects of challenging behaviors, an understanding of challenging behaviors in individuals with ASD is necessary. Little is known, however, about the development of challenging behaviors in infants and toddlers with ASD (Rojahn et al., 2009). Yet such knowledge is critical, as researchers have shown that interventions for challenging behaviors are most successful when initiated before 5 years of age, with continuing treatment being given as necessary (Carr, Severtson, & Lepper, 2009; Eikeseth, 2009; Hartley, Sikora, & McCoy, 2008; Lancioni, Singh, O'Reilly, & Sigafoos, 2009; Matson & Smith, 2008). While a number of instruments have been designed to assess for challenging behaviors in individuals with ID, few have been specifically designed for use with individuals with ASD, particularly infants and toddlers (Cohen et al., 2011). The Baby and Infant Screen for Children with aUtIsm Traits is an assessment battery designed to examine diagnostic criteria, symptoms of comorbidity, and challenging behaviors in infants and toddlers aged 17–37 months that are considered at-risk for an ASD.

Of particular interest is Part 3 of the BISCUIT, which assesses for challenging behaviors that are typical of infants and toddlers with ASD (Matson, Wilkins, Sevin, et al., 2009). The BISCUIT-Part 3 includes 15 parent or caregiver-rated items that are scored in comparison to other toddlers of the same age. Clinical cutoff scores have been developed that classify children as "no/minimal impairment," "moderate impairment," or "severe impairment" (Matson, Fodstad, & Mahan, 2009; Matson, Fodstad, Mahan, & Rojahn, 2010; Matson, Fodstad, Mahan, & Sevin, 2009; Rojahn et al., 2009). These cutoffs have been developed both for children with an ASD diagnosis and children with a non-ASD related developmental delay. While the current cutoff scores have utility, they do not currently account for the age of the child being assessed. Given the significant amount of development and change that occurs between the ages of 17 and 37 months (Dodson & Alexander, 1986; Green & Palfrey, 2002; Shelov & Hannemann, 1991), the inclusion of age-based scoring procedures would have the potential to allow the BISCUIT-Part 3 to more accurately identify those exhibiting moderate or severe challenging behaviors. The need for age-based scoring procedures is heightened by the fact that BISCUIT-Part 3 asks parents to compare their children to other same-aged children. Previous research has shown that as a child with ASD ages, both the core features and symptoms of comorbidity become more prominent, as the child falls further behind his or her typically developing peers (Charman & Baird, 2002; Desombre et al., 2006; Dixon, Granpeesheh, Tarbox, & Smith, 2011; Horovitz & Matson, 2013a,b; Landa & Garrett-Mayer, 2006; McConkey, Truesdale-Kennedy, & Cassidy, 2009; Mitchell et al., 2006; Werner & Dawson, 2005). As such, previous researchers have shown that, when distinguishing the core symptoms of ASD and comorbidity from atypical development, higher cutoff scores are needed as a child ages (Horovitz & Matson, 2013a,b). A similar pattern was thus hypothesized to be found when looking at challenging behaviors. The purpose of the current study was to develop age-based scoring procedures for Part 3 of the BISCUIT and to compare them to full-sample cutoff scores. The development of such cutoffs may help to more clearly and accurately identify those exhibiting moderate and severe levels of challenging behaviors, thereby leading to the delivery of appropriate treatment.

2. Materials and methods

2.1. Participants

A total of 3022 infants and toddlers aged 17–37 months ($M = 25.90$, SD = 4.78) and their caregivers served as the participants for the current study. The initial sample included 3460 infants and toddlers and their caregivers; however, 42 were removed because age was unknown or fell outside of the target age range (i.e., 17–37 months) and 300 were removed because they had not yet been assigned a diagnostic classification (via the process described further below). After removing these participants, the data were examined for missing values and outliers. Group z-scores for Part 3 of the BISCUIT with an absolute value greater than 3.29 were identified as outliers (Field, 2005). Participants missing at least 10% of data points or with scores identified as outliers were excluded from the analyses (Donner, 1982; Field, 2005; Matson, Wilkins, Sevin, et al., 2009). From the remaining sample of 3118 participants, 48 (1.56%) participants with missing data and 48 (1.56%) participants identified as outliers were removed from the analyses.